PROJECT NUMBER: 6908
PROJECT TITLE: Smoke Condensate Studies
PROJECT LEADER: R. D. Kinser
PERIOD COVERED: April, 1988

I. TSNA PRECURSORS

A. **Objective**: To determine the precursors of MS TSNA.

B. **Results**: An experiment was conducted to determine if a primary amine, which does not yield a stable nitrosamine upon nitrosation, would act as a nitrosating agent scavenger and lead to reduced levels of TSNA. MS TSNA deliveries from burley base web (BuBW) + anabasine + nitrate + dodecylamine were significantly greater (~two-fold increase) for NNN, NAT, and NAB. Interestingly, NNK levels were somewhat lower. These results, in conjunction with a previous study of dodecylamine added to DBC burley and nicotine-treated low alkaloid burley, indicate that addition of a primary amine is not a viable method for TSNA reduction. However, the different response of NNK to the addition of primary amine to BuBW will be investigated in the continuing research on the precursors of MS NNK.

C. **Plans**: Determine the NNK delivery of BuBW + nitrate and BuBW + nitrate + dodecylamine.

D. **References**:

Haut, S. A. Notebook 8595, p. 66.

II. TSNA DECOMPOSITION STUDIES

A. **Objective**: To explore the thermal stability of TSNA and investigate methods to enhance thermally induced decompositions of these compounds.

B. **Results**: Initial examination of the effect of propyl dihydroxyhydrocinnamate on the thermal decomposition of NNN indicated that PrDHHC was not as effective as ascorbyl palmitate.

C. **Plans**: Replicate the PrDHHC/NNN results and determine the effect of PrDHHC on NNK decomposition.

D. **References**:

Morgan, W. R. Notebook No. 8579, p. 42.
Tickle, M. H. Notebook No. 8587, p. 130.

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III. TSNA REMOVAL STUDIES

A. **Objective**: To explore the possibility of extracting TSNA from stored tobacco using an extraction fluid compatible with current processing.

B. **Results**: The utility of Amberlyst-15 cation exchange resin for the removal of TSNA from ethanol or hexane extracts of tobacco was examined. The ion exchange chromatography was effective for removal of TSNA from a hexane extract (67 - 100% decrease) but not for removal of TSNA from the ethanol extract (12 - 29% decrease). Analyses are being conducted to determine the alkaloid removal accomplished by passage of the extract through the Amberlyst-15 column.

C. **Plans**: Complete the alkaloid analyses, and begin combining the extraction step with removal of TSNA from the extraction solvent with the Amberlyst resin.

D. **References**:

Warfield, A. H. Notebook No. 8558, p. 93.

IV. SUPPORT FUNCTION: CONDENSATE PREPARATION

A. **Objective**: To fabricate cigarettes, perform smokings, and prepare condensate as needed for biological and chemical analysis.

B. **Results**: Seventy smokings of seventeen different cigarette codes were performed to yield condensate for biological assay. A smoking machine was modified to permit condensate collection from a new model cigarette. Condensate was collected from two cigarette types in response to a request from Analytical Research.

C. **References**:

Hellams, R. D. and McGee, N. H. Notebook No. 8613, p. 54.

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